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3. The shape of a typical cyclone, when appearing alone, or as a projection downward from a cloud, is exactly that of the cavity of a whirlpool, funnel-shaped, and is formed by the suction downward of the cloud to fill what corresponds to the cavity of a whirlpool in a stream.
4. The damage is done by the twisting rotary motion of the atmosphere, thus accounting for things being thrown in every direction, and not by rapid lateral movement; for, as with the whirlpools in the stream, the forward movement of a cyclone is sometimes quite slow.
5. Cyclones, as here explained, should occur in "twins" sometimes, one on either side of the rain current; and this actually did happen just one week later, June 13, 1917, a few miles farther west, near Wamego.

July 13, 1917.

On the Transmission of the Fowl Cestode, Davainea Cesticillus (Molin).

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In the vicinity of Manhattan, Kan., a large percentage of the fowls are infested with tapeworms. Of 161 chickens examined, 121, or 75.1 percent, had tapeworms in their intestinal tracts. The infestations ranged from one to two or three hundred, and in one instance a young chick harbored 443 of these parasitic worms. Fourteen to twenty-seven cestodes is common, and this number usually makes a visible effect upon the fowl, causing emaciation, loss of feathers, and general debility. The average infestation for the 161 chickens was 26.7 tapeworms per fowl.

Examinations of numerous poultry yards for possible intermediate hosts of chicken tapeworms gave strong circumstantial evidence against house flies. The latter were abundant, while other invertebrates were comparatively rare. It was found that the behavior of the house flies was not unlike that of the chickens. In the early morning they were moving about in the sunshine, but as the heat of the day came on the flies went to the shade, alighting upon the stones and the shady side of buildings. The fowls likewise were actively feeding in the morning, but by ten o'clock were in the shade, the young chicks pursuing flies while the old birds were preening their feathers. In the shade of the poultry house flies were crawling over the floor and feeding upon feces, which contained tapeworm embryos.

From fowls in the United States six different species of cestodes have been collected. Of these, *Davainea proglottina,* (Davaine), rare in this country, may be transmitted by a slug (*Limax cinereus*). Another, *Choanotænia infundibuliformis* (Goeze), may be transmitted by the house fly, *Musca domestica.* The means of transmitting any of the remaining four species was not known until the past summer, when an experiment demonstrated that the housefly may transmit to fowls another of these cestodes, which appears to be *Davainea cesticillus* (Molin, 1858), Blanchard, 1891.

The fowls used in the experiment were hatched in an incubator and placed at once in a fly-proof field cage, where they were given food free from animal tissues, with the exception of an occasional feeding of carefully selected beef scraps. Flies taken from nature were placed in small, lantern globe, cages, where they were given living embryos from fowl cestodes and kept alive as long as possible, in order to afford time for the development of larval tapeworms (cysticercoids) in the bodies of the flies.

By giving to the caged flies small amounts of whole sweet milk daily, fairly large numbers of them were kept alive for two or three weeks after they were fed the tapeworm onchospheres. Upon the death of these flies, they were either preserved for sectioning, or given to young chickens reared in the fly-proof field cage. In this way several hundred house flies were fed, a few at a time, to twelve chickens.

In the fowls examined to date, nine cestodes have been found, two from chick No. 165 being sexually mature. Control fowls from the same broods kept with the experimental chickens in no case yielded a single parasitic worm. (Control chicks have been kept constantly in this fly-proof and worm-proof field cage for four years, and in no instance has a control chick been infected with a helminth). That the two mature tapeworms from chick No. 165 are apparently *Davainea cesticillus,* is seen from the following diagnosis: Length, 79 to 90 mm. Maximum width, 1.6 to 2.3 mm. Head cylindrical, 0.5 to 0.6 mm. wide and 0.3 to 0.4 mm. long. Suckers unarmed, about 0.1 mm. in diameter. Rostellum broad and hemispherical, 0.29 mm. wide, armed with approximately 200 very unstable hooks. Hooks 8 to 9 microns long, with long ventral root and short dorsal root. Neck very short, followed by proglottids equal to or greater in width than the head. Anterior proglottids 3 to 6 times as broad as long; the following increase in size until they become equal in length and breadth and finally longer than broad; borders overlapping. Vagina and cirrus pouch pass on the dorsal side of the two excretory canals and nerve.

Male Reproductive Organs: Testes, 20 in number in the posterior portion of the proglottid. Ves deferens coiled before entering the base of the cirrus pouch, also coiled within the latter. Cirrus pouch ellipsoidal, 139 to 164 microns long by 65 to 82 microns wide. Cirrus when protracted, 131 microns long and 13 microns in diameter, armed with minute spines, and with a bulbous enlargement 21 microns in diameter at its base, where it becomes continuous with the cirrus pouch.

Female Reproductive Organs: Vagina enlarged before reaching the median line into a small seminal receptacle. Ovary occupies the middle field in front of the testes. Yolk gland and shell gland posterior to the ovary, ventral and dorsal, respectively, in relative position. Uterus at first in front of the ovary; gradually increasing in size, it finally occupies most of the segment, extending laterally to the excretory canals. In the oldest proglottids it becomes divided into compartments or capsules, each containing a single egg. Embryo, 35 by 31 microns in diameter, with a very thin membrane closely adherent to its surface. Embryo further enveloped by a thicker, smooth membrane, oval in shape, 42 to 36 microns in diameter. Latter surrounded by a thin, wrinkled membrane about 66 to 61 microns in diameter. Egg surrounded by a capsule composed of an outer and inner membrane.